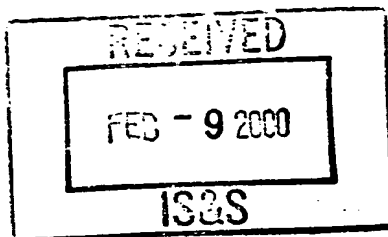


PATENT COOPERATION TREATY



PCT

From the INTERNATIONAL BUREAU

To:

TRIPOLI, Joseph, S.
 GE & RCA Licensing Management
 Operation, Inc.
 P.O. Box 5312
 Princeton, NJ 08543
 ÉTATS-UNIS D'AMÉRIQUE

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
 Administrative Instructions, Section 422)

| | |
|--|---|
| Date of mailing (day/month/year) 28 January 2000 (28.01.00) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference RCA 88741 | |
| International application No. PCT/US98/17920 | International filing date (day/month/year) 28 August 1998 (28.08.98) |

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

THOMSON CONSUMER ELECTRONICS, INC.
 10330 North Meridian Street
 Indianapolis, IN 46290
 United States of America

State of Nationality

US

State of Residence

US

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☒ the name ☒ the address ☒ the nationality ☐ the residence

Name and Address

THOMSON LICENSING SA
 46 Quai A. Le Galo
 92648 Boulogne
 Cedex,
 France

State of Nationality

FR

State of Residence

FR

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

P. Regis

Telephone No.: (41-22) 338.83.38

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/17920

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 H04N3/233 H04N9/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No |
|----------|---|----------------------|
| X | EP 0 665 695 A (TOKYO SHIBAURA ELECTRIC CO) 2 August 1995 see column 4, line 37 - column 5, line 20 | 1, 14, 16 |
| A | --- | 5, 12 |
| X | MAKOTO SHIOMI ET AL: "A FULLY DIGITAL CONVERGENCE SYSTEM FOR PROJECTION TV" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. 36, no. 3, 1 August 1990, pages 445-452. XP000162874 see page 448, left-hand column, line 15 - line 34 | 1, 14, 16 |
| A | --- | 5, 12 |
| X | US 5 345 280 A (KIMURA YUICHIRO ET AL) 6 September 1994 see column 9, line 50 - column 10, line 18 | 1, 14, 16 |
| | ----- | |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

Special categories of cited documents:

- "T" document relating to the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

14 October 1998

Date of mailing of the international search report

21/10/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Bequet, T

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/17920

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|----------------------------|---------------------|
| EP 0665695 | A | 02-08-1995 | JP 7212779 A | 11-08-1995 |
| | | | CA 2141160 A | 27-07-1995 |
| US 5345280 | A | 06-09-1994 | JP 5244615 A | 21-09-1993 |

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|--|--|
| Applicant's or agent's file reference RCA 88741 | FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small> | |
| International application No. PCT/US 98/ 17920 | International filing date (day/month/year) 28/08/1998 | (Earliest) Priority Date (day/month/year) 29/08/1997 |
| Applicant THOMSON CONSUMER ELECTRONICS, INC. et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).
2. ☐ Unity of invention is lacking (see Box II).
3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority
4. With regard to the title, ☒ the text is approved as submitted by the applicant
☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,

☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:
 Figure No. 1 ☒ as suggested by the applicant. ☐ None of the figures.
☐ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

National Application No

PCT/US 98/17920

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04N3/233 H04N9/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | EP 0 665 695 A (TOKYO SHIBAURA ELECTRIC CO) 2 August 1995 see column 4, line 37 - column 5, line 20 | 1, 14, 16 |
| A | --- | 5, 12 |
| X | MAKOTO SHIOMI ET AL: "A FULLY DIGITAL CONVERGENCE SYSTEM FOR PROJECTION TV" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. 36, no. 3, 1 August 1990, pages 445-452, XP000162874 see page 448, left-hand column, line 15 - line 34 | 1, 14, 16 |
| A | --- | 5, 12 |
| X | US 5 345 280 A (KIMURA YUICHIRO ET AL) 6 September 1994 see column 9, line 50 - column 10, line 18 | 1, 14, 16 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

14 October 1998

Date of mailing of the international search report

21/10/1998

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bequet, T

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/17920

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|----------------------------|---------------------|
| EP 0665695 | A | 02-08-1995 | JP 7212779 A | 11-08-1995 |
| | | | CA 2141160 A | 27-07-1995 |
| US 5345280 | A | 06-09-1994 | JP 5244615 A | 21-09-1993 |

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|---|---|--|
| Applicant's or agent's file reference RCA 88741 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US98/17920 | International filing date (day/month/year) 28/08/1998 | Priority date (day/month/year) 29/08/1997 |
| International Patent Classification (IPC) or national classification and IPC H04N3/233 | | |
| Applicant THOMSON CONSUMER ELECTRONICS, INC. et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of two sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand

22/03/1999

Date of completion of this report

18.11.99

Name and mailing address of the international preliminary examining authority:



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D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Weber-Kluz, F

Telephone No. +49 89 2399 8630



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US98/17920

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-13 as originally filed

Claims, No.:

5-8,10,12,13 as received on 20/09/1999 with letter of 16/09/1999

Drawings, sheets:

1/8-8/8 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☒ the claims, Nos.: 1-4,9,11,14-16
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US98/17920

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|------|--------|--------------|
| Novelty (N) | Yes: | Claims | 5-8,10,12,13 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 5-8,10,12,13 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 5-8,10,12,13 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US98/17920

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The present application relates to the digital generation of geometric and convergence correction signal waveforms.

In the prior art it is known to have geometry convergence correction waveforms using linear interpolation for the intervening values (as shown e.g. in figure 5 of the present application). But such waveforms result in banded regions in the image (figure 6 of present application). In order to eliminate banding, the correction values along each column could be modified so that they have no change of slopes (figure 7 of present application). But such waveforms introduce pincushion curvature in the image.

The object of the invention is a simultaneous minimization of banding and pincushion distortion, as claimed in independent claims 5 and 12.

None of the cited documents discloses or suggests minimized banding with correction of pincushion distortion as claimed.

The requirements of Article 33(4) PCT are met.

Re Item VII

Certain defects in the international application

The description, in particular the part relating to the "Summary of invention", is not in conformity with the claims presently on file as required by Rule 5.1(a)(iii) PCT.

Re Item VIII

Certain observations on the international application

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US98/17920

It is clear from the description on page 10 (lines 2 and 20,21) that **linear** interpolation is essential to the definition of the invention.

Since independent claims 5 and 12 do not contain this feature they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

WHAT IS CLAIMED IS :

1 1. A deflection correction circuit, comprising:
2 a memory having stored therein displacement values
3 applicable to spaced points in a grid of rows and columns, the
4 displacement values being selected to avoid significant banding effects
5 while generally defining S-shaped correction curves;
6 an interpolator generating intermediate values between
7 adjacent ones of said stored displacement values;
8 a digital to analog converter coupled to said interpolator
9 for receiving said intermediate values and generating therefrom a
10 correction signal for driving a deflection correction coil.

1 2 The circuit of claim 1, wherein said displacement values
2 applicable columns generally define S-shaped correction curves that
3 are maximized at least two of said columns corresponding to areas of a
4 display screen that are spaced from both a center axis and one of two
5 opposite edges of said display screen, and minimized adjacent to the
6 center axis and the opposite edges

1 3. The circuit of claim 1, wherein S-shaped correction is
2 added in successive steps proceeding from said areas that are spaced
3 from the center axis, toward said center axis and toward said edges,
4 respectively.

1 4. The circuit of claim 1, wherein said displacement values
2 represent interpolated values applicable to said grid.

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1 9. The video display of claim 8, wherein said linear
2 interpolating means generates said intervening values adjacent ones of
3 said interpolated displacement values.

1 10. The video display of claim 5, wherein said linear
2 interpolating means generates said intervening values adjacent ones of
3 said displacement values during a display period.

1 11. The video display of claim 5, wherein said deflection
2 correction coil is mounted on a green CRT.

1 12. A method for digitally correcting geometric distortion of an
2 image on a display screen, comprising the steps of:

3 defining a matrix of spaced adjustment points on the display
4 screen, in horizontally spaced vertical columns of values for local
5 displacement of the image at the adjustment points on the display
6 screen, the values for said columns defining S-shaped vertical
7 correction waveforms having varying slope between adjacent ones of
8 the values;

9 linearizing the values for at least two areas of the matrix
10 corresponding to a center axis and opposite edges, and applying
11 progressively greater S-correction proceeding from said center axis
12 and from said edges, to areas of the display screen spaced between the
13 center axis and the opposite edges;

14 storing the matrix values in a memory;

15 reading said stored matrix values; and,

16 locally displacing said image as a function of said stored matrix
17 values for corresponding adjustment points to correct the image on the
18 display screen.

- 17 -

1 13. The method of claim 12, further comprising linearly
2 interpolating between adjacent ones of the matrix values in the
3 vertical columns to define correction values for scan lines between the
4 adjustment points, and locally displacing the image between the
5 adjustment points as a function of the linearly interpolated correction
6 values.

1 14. A video apparatus having a display screen subject to image
2 distortion, comprising:
3 a cathode ray tube for displaying an image;
4 a deflection coil located on said cathode ray tube;
5 a drive amplifier coupled to said deflection coil;
6 a digital to analog converter with an output coupled to said
7 drive amplifier;
8 a memory having stored therein interpolated displacement
9 values corresponding to spaced points in a grid of rows and columns;
10 and,
11 an interpolator coupled to said memory and responsive to
12 said stored interpolated displacement values for interpolating values
13 adjacent ones of said stored interpolated displacement values,
14 said digital to analog converter being coupled to said
15 interpolator for generating a correction signal to drive said deflection
16 coil to correct said image distortion.

1 15. The apparatus of claim 14, wherein said stored
2 interpolated displacement values for said columns generally define S-
3 shaped correction curves.

- 18 -

1 16. A circuit for generating a correction signal to correct image
2 distortion on a display screen, comprising:
3 a memory storing displacement values corresponding to
4 spaced points on said screen in a grid of rows and columns, the
5 displacement values of said grid generally defining correction curves
6 for correcting said image distortion without introducing significant
7 banded regions on said display screen;
8 an interpolator coupled to said memory for interpolating
9 intermediate values between adjacent ones of said stored
10 displacement values; and,
11 a digital to analog converter coupled to said interpolator for
12 providing said correction signal.